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Grain and Forage Crops

Estimated Production Costs

Ontario

ECONOMICS AND POLICY
COORDINATION BRANCH

ONTARIO MINISTRY OF AGRICULTURE AND FOOD
LEGISLATIVE BUILDINGS, TORONTO, ONTARIO, M7A 1B6

ECONOMICS INFORMATION

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GRAIN AND FORAGE CROPS
ESTIMATED PRODUCTION COSTS
ONTARIO, 1986

Economics and Policy Coordination Branch
Ontario Ministry of Agriculture and Food
Legislative Buildings, Queen's Park
Toronto, Ontario, M7A 1B6
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INTRODUCTION

Since 1948, the Economics and Policy Coordination Branch has carried out comprehensive studies of major field and horticultural crops grown in Ontario. These studies were designed to determine costs and returns of various farm enterprises, as well as the physical amounts of production inputs required.

Traditionally, data was collected by means of farmer interviews. Published reports of these studies in the form of county, regional and provincial averages found a wide distribution among extension and research personnel, educational institutions, farm organizations, lending institutions and policy makers. Cooperating farmers received reports showing their individual information in comparison with group averages.

With this extensive background in the development of cost studies, the Economics and Policy Coordination Branch has begun to use computers in the preparation of cost data. Methods of computer simulation have now replaced the time consuming process of data collection, tabulation and analysis.

With this new approach, special attention is paid to the physical quantities and prices of inputs for each crop studied. The technology used in the production of various crops is carefully examined so that the computer models accurately reflect the appropriate production technology for each commodity.

Information on physical inputs is obtained from a number of sources, including:

1. Previous studies done by this Branch;
2. Surveys of the farm supply trade;
3. Technical input/output coefficients; and
4. The consensus of producers, researchers, and extension and agribusiness personnel.

THE DEVELOPMENT OF THE ACRES PROGRAM

A large number of computer programs that generate budgets and crop production cost estimates are now in existence. These computer programs vary in their degree of sophistication and in the amount of detail prepared. A large number of estimates covering a wide range of conditions can be generated quickly and efficiently. The effect of varying levels of technology, management practices and price levels can also be analyzed.

Cost of production estimates used in this report are based on the ACRES program. ACRES (Agricultural Crop Enterprises System) is a FORTRAN program originally written in Montana, adapted by Alberta Agriculture and recently modified and rewritten by the Economics and Policy Coordination Branch to meet Ontario conditions. All 1986 cost of production estimates in this report are based on this computer model.

METHODS AND PROCEDURES

The information used in the preparation of each production cost estimate in this report was prepared through the use of recent Economics and Policy Coordination Branch studies, plus consultations with producers and extension, research and agribusiness personnel.

For each crop cost estimate in this report, the data was organized into variable and fixed costs and totalled to arrive at the cost of production both on a per acre and per hectare basis. Variable costs are those which vary directly with the production of each crop grown. They include seed, plants, hired labor, fertilizer, herbicides, insecticides, fungicides, other materials, machinery operating costs, marketing charges and interest on operating capital. Fixed cost inputs are operator labor, management allowance, interest on land, machinery and buildings, depreciation on machinery and buildings, taxes on real estate (net of farm tax rebate), and other overhead cost items.

In this report, cash costs of production are also determined. Cash costs include total variable costs, interest on the debt portion of investment in tractors and machines, taxes and other overhead costs.

LABOR HOURS AND COSTS

The required number of labor hours was based on previous studies, as well as through discussions with those familiar with the production of each study crop. There are some crops which are harvested on a fixed rate per unit. For these crops, the labor hours and costs vary with the yields used in the cost estimate.

The operator labor hours were valued at $6.75 per hour. In addition, an allowance to management was made at the rate of 5 percent of the gross income.

The hired labor cost was calculated on a per hour basis and included benefits such as worker compensation, unemployment insurance, and the Canada Pension Plan. The rates varied according to area, crop and skill involved.

For some crops, piece work rates were used which were suggested by local farm labor pools. An allowance of 15 percent of basic earnings was added to cover benefits.

MATERIALS

The amount of each material input was based on commonly used practices. Input prices are based on averages charged by the trade in the area where the particular crop is grown. For most crops, the quantities of seed, plants, fertilizer nutrients and other inputs are given on a per hectare basis. Because of the multitude of products available, pesticides are grouped as herbicides, insecticides, fungicides, nematicides, etc. The cost and quantity of non-returnable containers is reported where applicable.

TRACTORS, MACHINES AND TRUCKS

Machinery complements used in the various crop production cost estimates were assumed to be five years old. Tractor and machine costs included depreciation, interest on investment, insurance, storage, repairs, maintenance, fuel and lubrication. If machines were used for other farming operations, costs were adjusted based on the proportion of use on the study crop. The declining balance method of depreciation was used, and a 15 percent rate to powered and a 10 percent rate to non-powered machines was applied.

Interest on machinery investment was calculated on the assumption that the equity portion was 70 percent and the debt portion was 30 percent of the total depreciated value. For this report, interest on equity was calculated at 6.1 percent, which was the average interest rate paid by chartered banks on savings accounts. The interest on the debt portion was based on the average prime rate of 10.5 percent, plus one for a total of 11.5 percent. Insurance and storage costs for machinery were based on 1.5 percent of their purchase price.

Repair and maintenance costs for individual machines were based on the fact sheet, "Cost of Owning and Operating Farm Machines", Agdex 825, Ontario Ministry of Agriculture and Food.

Fuel costs were based on the size of each tractor, truck or self-propelled machine used in the production operation. The following farmgate fuel prices were used: gasoline - 36.0 cents/litre; diesel - 37.0 cents/litre. The cost of oil, grease and filters was calculated at 15 percent of the fuel cost.

CUSTOM FARMWORK SERVICES

There are crops produced in Ontario where it is an accepted practice to use custom farmwork services to perform certain operations. Usually, these services are employed when the farmer needs specialized machines, such as harvesters, sprayers, fertilizer applicators and trucks. Most of these machines cannot be economically owned and operated by one producer. Custom costs were itemized on a per hectare or per acre basis.

LAND CHARGES

Determining the annual cost for land use is a controversial part in any study on production costs. During the past two decades, purchasers of farmland have been willing to pay more for it than can be justified from agricultural production. Purchasers believe the speculative aspect of land ownership in inflationary times offers benefits above those received from crop production. In deflationary times, however, this situation is reversed. For this reason, the appropriate interest rate used in calculating the interest cost on bare land for these crop production estimates is the real interest rate. The "real interest rate" is defined as the current lending rate of interest adjusted for inflation.

In this report, interest on land investment was calculated as follows:

1. The value of bare land was based on the average value for land in areas of Ontario where the production of each study crop predominates.

2. The interest rate applied was the prime rate discounted for the rate of inflation, which resulted in a 6.6 percent rate.

The farm real estate taxes used for each study crop reflect the area of production and are subject to Ontario's Farm Tax Reduction Program.

BUILDING COSTS

For those crops where buildings are used in grading, packing, and/or storage, a building cost allowance was made.

The initial cost of these structures was based on the assumption that buildings were five years old.

Depreciation	%
Steel and concrete structures	2.5
Wood structures	5.0
Greenhouses	2.0

The interest on building investment was set at 6.4 percent, which was also used in calculating interest on land investment.

Repairs and Maintenance	%
Steel structures	1.0
Concrete structures	0.25
Wood structures	1.5

Insurance

0.5 percent of initial costs

The cost of machine housing was covered under tractor and machine costs.

Allowances are made for the use of picking baskets, storage bins, and other pieces of reusable equipment required in the production of certain crops.

INTEREST ON OPERATING CAPITAL

Interest on operating capital required to finance each crop was calculated from the time an expenditure was made until the time income was generated from sales. Operating capital includes the cost of materials, fuel, repairs, hired labor and other cash items. In this study, the interest rate applied to operating capital was the average prime rate of 10.5 percent plus 1 percent.

OTHER OVERHEAD

This allowance covers such items as the study crop's share of utilities, accounting and administration costs, use of the farm automobile, and general farm maintenance.

OTHER COST CONSIDERATIONS

Depending on the crop studied, there are certain additional costs such as crop insurance, marketing board fees, grading charges and selling commissions.

YIELDS AND RETURNS

For each study crop presented in this report, a footnote to the table defines how the average yield and average price were calculated.

Additional information on average yields and prices is shown in the Appendix of this report.

GROSS MARGIN ANALYSIS

Gross margin is the amount above the variable costs that a crop contributes to the operator for his wages, management, and to the investment in machinery and land.

CASH ANALYSIS

The cash analysis section estimates the returns over cash costs. Cash costs comprise of all variable costs, as well as interest on the debt portion of tractor and machine investment, real estate taxes and other overhead costs.

Table 1. - Barley: Estimated Cost of Production, Ontario, 1986

	Cost, $	
	per hectare	per acre
VARIABLE COSTS		
Hired labor, 0.9 hours/ha	5	2
Seed, 111 kg/ha	36	14
Fertilizer, N - 44 kg/ha; P_2O_5 - 44 kg/ha; K_2O - 44 kg/ha	70	28
Herbicide	4	2
Tractor and machine costs:		
Repairs and maintenance	36	15
Fuel	38	15
Crop insurance	13	5
Interest on operating capital	8	3
TOTAL	210	84
FIXED COSTS		
Operator labor, 3.46 hours/ha	23	9
Management allowance, 5% of gross income	19	8
Tractor and machine costs:		
Depreciation	48	19
Interest on investment	29	12
Insurance and storage	10	4
Interest on land, $1,556/ha @ 6.6% per annum	103	42
Taxes	14	6
Other overhead	37	15
TOTAL	283	115
TOTAL ALL COSTS[a]	493	199
COST PER UNIT (Based on average yields of 3.12 tonne/ha and 58 bushels/acre)[b]	$158.01/tonne	$3.43/bu.
GROSS MARGIN ANALYSIS (Based on average prices of $125.38/tonne and $2.73/bushel)[c]		
Gross income	391	158
Total variable costs	210	84
Gross margin	181	74
CASH ANALYSIS		
Gross income	391	158
Cash costs[d]	273	110
Returns over cash costs	118	48

[a] Storage costs not included, also costs and returns for straw handling not considered.

[b] Five-year average weighted yields for 1981-85.

[c] Three-year average weighted prices 1983-85.

[d] Cash costs include total variable costs, plus interest on debt portion of investment in tractors and machines of $12/ha ($5/acre) plus taxes and other overhead costs.

Table 2. - Barley: Operation Costs, Ontario, 1986

Operation	Times over	Labor hours per ha	Labor hours per ac.	Labor, tractor and machine costs, $ per ha	Labor, tractor and machine costs, $ per ac.
Plowing	1	.79	.32	33.04	13.37
Discing	1	.30	.12	14.55	5.89
Spreading fertilizer	1	.49	.20	12.36	5.00
Cultivating & harrowing	1	.25	.10	10.18	4.12
Hauling seed	1	.15	.06	4.67	1.89
Planting	1	.59	.24	21.47	8.69
Spraying herbicide	1	.30	.12	8.03	3.25
Combining	1	.74	.30	64.82	26.23
Hauling & unloading at storage	1	.74	.30	19.79	8.01

Table 3. - Grain Corn: Estimated Cost of Production, Ontario, 1986

	Cost, $	
	per hectare	per acre
VARIABLE COSTS		
Hired labor, 1.24 hours/ha	7	3
Seed, 64,250 kg/ha	60	24
Fertilizer, N - 156 kg/ha; P_2O_5 - 55 kg/ha; K_2O - 28 kg/ha	106	43
Herbicide	51	21
Insecticide	28	12
Tractor and machine costs:		
Repairs and maintenance	39	16
Fuel	32	13
Custom drying charges	79	32
Custom storge, 1/2 crop for 5 months	24	9
Custom apply "N"	20	8
Crop insurance	17	7
Marketing fee	2	1
Interest on operating capital	27	11
TOTAL	492	200
FIXED COSTS		
Operator labor, 3.61 hours/ha	24	10
Management allowance, 5% of gross income	41	16
Tractor and machine costs:		
Depreciation	52	21
Interest on investment	33	13
Insurance and storage	13	5
Interest on land, $2,669/ha @ 6.6% per annum	176	71
Taxes	14	6
Other overhead	37	15
TOTAL	390	157
TOTAL ALL COSTS	882	357
COST PER UNIT (Based on average yields of 6.09 tonne/ha and 97 bushels/acre)[a]	$144.83/tonne	$3.68/bu.
GROSS MARGIN ANALYSIS (Based on average prices of $134.21/tonne and $3.41/bushel)[b]		
Gross income	817	331
Total variable costs	492	200
Gross margin	325	131
CASH ANALYSIS		
Gross income	817	331
Cash costs[c]	557	227
Returns over cash costs	260	104

[a] Five-year average weighted yields for 1981-85.

[b] Three-year average weighted prices 1983-85.

[c] Cash costs include total variable costs, plus interest on debt portion of investment in tractors and machines of $14/ha ($6/acre) plus taxes and other overhead costs.

Table 4. - Grain Corn: Operation Costs, Ontario, 1986

Operation	Times over	Labor hours per ha	Labor hours per ac.	Labor, tractor and machine costs, $ per ha	Labor, tractor and machine costs, $ per ac.
Plowing, fall	1	.79	.32	33.04	13.37
Discing	1	.30	.12	14.55	5.89
Spreading fertilizer	1	.25	.10	5.93	2.40
Spray herbicide	1	.30	.12	8.03	3.25
Cultivate, harrow and pack	1	.32	.13	12.73	5.15
Hauling seed	1	.12	.05	3.76	1.52
Planting	1	.59	.24	27.08	10.96
Row cultivating	1	.32	.13	8.08	3.27
Custom apply "N"	1	—	—	19.52	7.90
Spray herbicide	1	.30	.12	8.03	3.25
Combining	1	.79	.32	69.12	27.97
Hauling to storage	1	.79	.32	20.48	8.29
Custom drying	1	—	—	79.32	32.10

Table 5. - Oats: Estimated Cost of Production, Ontario, 1986

	Cost, $	
	per hectare	per acre
VARIABLE COSTS		
Hired labor, 0.9 hours/ha	5	2
Seed, certified, 62 kg/ha	25	10
Fertilizer, N - 44 kg/ha; P_2O_5 - 44 kg/ha; K_2O - 44 kg/ha	70	28
Herbicide	4	2
Tractor and machine costs:		
Repairs and maintenance	35	14
Fuel	38	15
Crop insurance	13	5
Interest on operating capital	7	3
TOTAL	197	79
FIXED COSTS		
Operator labor, 3.46 hours/ha	23	9
Management allowance, 5% of gross income	14	6
Tractor and machine costs:		
Depreciation	48	19
Interest on investment	29	12
Insurance and storage	10	4
Interest on land, $1,556/ha @ 6.6% per annum	103	42
Taxes	14	6
Other overhead	37	15
TOTAL	278	113
TOTAL ALL COSTS[a]	475	192
COST PER UNIT (Based on average yields of 2.17 tonne/ha and 57 bushels/acre)[b]	$218.89/tonne	$3.37/bu.
GROSS MARGIN ANALYSIS (Based on average prices of $130.30/tonne and $2.01/bushel)[c]		
Gross income	283	115
Total variable costs	197	79
Gross margin	86	36
CASH ANALYSIS		
Gross income	283	115
Cash costs[d]	260	105
Returns over cash costs	23	10

[a]Storage costs not included, also costs and returns for straw handling not considered.

[b]Five-year average weighted yields for 1981-85.

[c]Three-year average weighted prices 1983-85.

[d]Cash costs include total variable costs, plus interest on debt portion of investment in tractors and machines of $12/ha ($5/acre) plus taxes and other overhead costs.

Table 6. - Oats: Operation Costs, Ontario, 1986

Operation	Times over	Labor hours per ha	Labor hours per ac.	Labor, tractor and machine costs, $ per ha	Labor, tractor and machine costs, $ per ac.
Plowing	1	.70	.32	33.04	13.37
Discing	1	.30	.12	14.55	5.89
Spreading fertilizer	1	.49	.20	12.36	5.00
Cultivating and harrowing.	1	.25	.10	10.18	4.12
Hauling seed	1	.15	.06	4.67	1.89
Planting	1	.59	.24	21.47	8.69
Spraying herbicide	1	.30	.12	8.03	3.25
Combining	1	.74	.30	64.82	26.23
Hauling and unloading at storage	1	.74	.30	19.79	8.01

Table 7. - Soybeans: Estimated Cost of Production, Ontario, 1986

	Cost, $	
	per hectare	per acre
VARIABLE COSTS		
Hired labor, 1.60 hours/ha	10	4
Seed, 67 kg/ha	50	20
Fertilizer, N - 15 kg/ha; P_2O_5 - 54 kg/ha; K_2O - 27 kg/ha	45	18
Herbicide	55	22
Seed treatment	10	4
Tractor and machine costs:		
Repairs and maintenance	37	15
Fuel	40	16
Custom storage, 1/2 crop for 5 months	7	3
Crop insurance	16	6
Marketing fees	3	1
Interest on operating capital	13	5
TOTAL	286	114
FIXED COSTS		
Operator labor, 3.09 hours/ha	21	8
Management allowance, 5% of gross income	32	13
Tractor and machine costs:		
Depreciation	52	21
Interest on investment	32	13
Insurance and storage	11	5
Interest on land, $2,669/ha @ 6.6% per annum	176	71
Taxes	14	6
Other overhead	37	15
TOTAL	375	152
TOTAL ALL COSTS	661	266
COST PER UNIT (Based on average yields of 2.29 tonne/ha and 34 bushels/acre)[a]	$288.65/tonne	$7.82/bu.
GROSS MARGIN ANALYSIS (Based on average prices of $282.48/tonne and $7.69/bushel)[b]		
Gross income	647	261
Total variable costs	286	114
Gross margin	361	147
CASH ANALYSIS		
Gross income	647	261
Cash costs[c]	351	141
Returns over cash costs	296	120

[a] Five-year average weighted yields for 1981-85.

[b] Three-year average weighted prices 1983-85.

[c] Cash costs include total variable costs, plus interest on debt portion of investment in tractors and machines of $14/ha ($6/acre) plus taxes and other overhead costs.

Table 8. - Soybeans: Operation Costs, Ontario, 1986

Operation	Times over	Labor hours per ha	Labor hours per ac.	Labor, tractor and machine costs, $ per ha	Labor, tractor and machine costs, $ per ac.
Plowing, fall	1	.72	.29	29.50	11.94
Discing	1	.30	.12	14.55	5.89
Spreading fertilizer	1	.25	.10	6.00	2.43
Spray herbicide	1	.30	.12	8.03	3.25
Incorporate spray	1	.32	.13	13.47	5.45
Hauling seed	1	.12	.05	3.53	1.43
Planting	1	.49	.20	22.56	9.13
Rotary hoeing	1	.27	.11	7.54	3.05
Row cultivating	1	.40	.16	9.86	3.99
Combining	1	.77	.31	67.88	27.47
Hauling to storage	1	.77	.31	19.89	8.05

Table 9. - White Beans: Estimated Cost of Production, Ontario, 1986

	Cost, $	
	per hectare	per acre
VARIABLE COSTS		
Hired labor, 1.3 hours/ha	6	2
Seed, 49 kg/ha	41	17
Fertilizer, N - 28 kg/ha; P_2O_5 - 64 kg/ha; K_2O - 32 kg/ha	71	29
Herbicide	78	32
Fungicide	8	3
Tractor and machine costs:		
Repairs and maintenance	43	17
Fuel	44	17
Custom haul	9	4
Crop insurance	27	11
Marketing fees	9	3
Interest on operating capital	19	8
TOTAL	355	143
FIXED COSTS		
Operator labor, 7.3 hours/ha	49	20
Management allowance, 5% of gross income	37	15
Tractor and machine costs:		
Depreciation	76	32
Interest on investment	47	20
Insurance and storage	17	7
Interest on land, $2,669/ha @ 6.6% per annum	176	71
Taxes	13	5
Other overhead	37	15
TOTAL	452	185
TOTAL ALL COSTS[a]	807	328
COST PER UNIT (Based on average yields of 1.48 tonne/ha and 13.4 cwt/acre)[b]	$545.27/tonne	$24.48/cwt
GROSS MARGIN ANALYSIS (Based on average prices of $500.00/tonne and $22.35/cwt)[c]		
Gross income	740	299
Total variable costs	355	143
Gross margin	385	157
CASH ANALYSIS		
Gross income	740	299
Cash costs[d]	427	172
Returns over cash costs	313	128

[a]Storage costs not included, also costs and returns for straw handling not considered.

[b]Five-year average weighted yields for 1981-85.

[c]Three-year average weighted prices 1983-85.

[d]Cash costs include total variable costs, plus interest on debt portion of investment in tractors and machines of $22/ha ($9/acre) plus taxes and other overhead costs.

Table 10. - White Beans: Operation Costs, Ontario, 1986

Operation	Times over	Labor hours per ha	Labor hours per ac.	Labor, tractor and machine costs, $ per ha	Labor, tractor and machine costs, $ per ac.
Plowing	1	1.23	.50	37.66	15.24
Field cultivate	3	1.11	.45	29.58	11.97
Spray herbicide (preplant)	1	.49	.20	10.13	4.10
Incorporate spray	1	.37	.15	10.11	3.99
Haul seed and fertilizer	1	.22	.09	4.10	1.66
Planting	1	.74	.30	29.01	11.74
Pick stones	1	1.11	.45	16.04	6.49
Row cultivate	2	1.48	.60	28.32	11.46
Spray herbicide (preemerge)	1	.49	.20	10.13	4.10
Pull and windrow	1	.67	.27	48.01	19.43
Combining	1	.67	.27	59.40	24.04
Custom hauling to market	1	—	—	9.24	3.74

— not applicable

Table 11. - Winter Wheat: Estimated Cost of Production, Ontario, 1986

	Cost, $	
	per hectare	per acre
VARIABLE COSTS		
Hired labor, .15 hours/ha	1	x
Seed, 124 kg/ha	46	18
Fertilizer, N - 93 kg/ha; P_2O_5 - 55 kg/ha; K_2O - 28 kg/ha	91	37
Herbicide	4	2
Tractor and machine costs:		
Repairs and maintenance	47	19
Fuel	31	13
Custom apply "N"	12	5
Crop insurance	15	6
Marketing board fee	3	1
Interest on operating capital	19	8
TOTAL	269	109
FIXED COSTS		
Operator labor, 4.57 hours/ha	29	12
Management allowance, 5% of gross income	29	12
Tractor and machine costs:		
Depreciation	53	21
Interest on investment	31	12
Insurance and storage	9	4
Interest on land, $2,669/ha @ 6.6% per annum	176	71
Taxes	14	6
Other overhead	37	15
TOTAL	378	153
TOTAL ALL COSTS[a]	647	262
COST PER UNIT (Based on average yields of 3.70 tonne/ha and 55 bushels/acre)[b]	$174.86/tonne	$4.76/bu.
GROSS MARGIN ANALYSIS (Based on average prices of $154.65/tonne and $4.21/bushel)[c]		
Gross income	572	232
Total variable costs	269	109
Gross margin	303	123
CASH ANALYSIS		
Gross income	572	232
Cash costs[d]	334	136
Returns over cash costs	228	96

x = less than 50 cents per acre.

[a]Storage costs not included, also costs and returns for straw handling not considered.

[b]Five-year average weighted yields for 1981-85.

[c]Three-year average weighted prices 1983-85.

[d]Cash costs include total variable costs, plus interest on debt portion of investment in tractors and machines of $14/ha ($6/acre) plus taxes and other overhead costs.

Table 12. - Winter Wheat: Operation Costs, Ontario, 1986

Operation	Times over	Labor hours per ha	Labor hours per ac.	Labor, tractor and machine costs, $ per ha	Labor, tractor and machine costs, $ per ac.
Plowing	1	.79	.32	33.04	13.37
Discing	2	.59	.24	29.16	11.80
Spreading fertilizer	1	.25	.10	6.20	2.51
Cultivating, harrowing and packing	1	.30	.12	13.05	5.28
Hauling seed	1	.15	.06	4.67	1.89
Planting in fall	1	.62	.25	22.39	9.06
Applying "N" in spring (Custom)	1	—	—	12.36	5.00
Spraying herbicide	1	.30	.12	8.03	3.25
Combining	1	.74	.30	64.82	26.23
Hauling to elevator	1	.74	.30	19.77	8.00

Table 13. - Alfalfa Hay: Estimated Cost of Production, Ontario, 1986

	Cost, $	
	per hectare	per acre
VARIABLE COSTS		
Establishment costs:		
Alfalfa seed, 11.1 kg/ha	67	27
Timothy seed, 2.5 kg/ha	5	2
Fertilizer; P_2O_5 - 33 kg/ha;		
K_2O - 100 kg/ha (applied)	47	19
Herbicide	21	8
Crop insurance	7	3
Total establishment costs	147	59
Annual cost (establishment costs spread over 3 years of production)	49	20
Hired labor, 6.0 hours/ha	29	12
Fertilizer, P_2O_5 - 37 kg/ha;		
K_2O - 111 kg/ha (fall applied)	52	21
Twine	20	8
Tractor and machine costs:		
Repairs and maintenance	26	11
Fuel	25	10
Crop insurance	15	6
Interest on operating capital	13	5
TOTAL	229	93
FIXED COSTS		
Operator labor, 5.26 hours/ha	36	15
Management allowance, 5% of gross income	30	12
Tractor and machine costs:		
Depreciation	94	38
Interest on investment	57	23
Insurance and storage	20	8
Interest on land, $2,224/ha @ 6.6% per annum	146	59
Taxes	13	5
Other overhead	25	10
TOTAL	421	170
TOTAL ALL COSTS[a]	650	263
COST PER UNIT (Based on average yields of 9.0 tonne/ha and 4.0 ton/acre)	$72.20/tonne	$65.74/ton
GROSS MARGIN ANALYSIS (Based on average prices of $65.99/tonne and $59.86/ton)[b]		
Gross income	594	239
Total variable costs	229	93
Gross margin	365	146
CASH ANALYSIS		
Gross income	594	239
Cash costs[c]	292	118
Returns over cash costs	302	121

[a]Storage costs not included.

[b]Average hay price, 1980-84, from Ontario Agricultural Statistics, $52.49/tonne or $47.62/ton. Premium for 3% additional crude protein @ 45 cents/kg; $65.99/t; $59.86/ton.

[c]Cash costs include variable costs, plus interest on debt portion of investment in tractors and machines of $26/ha ($10/acre) plus taxes and other overhead costs.

Table 14. - Alfalfa Hay: Operation Costs, Ontario, 1986

Operation	Times over	Labor hours per ha	Labor hours per ac.	Labor, tractor and machine costs, $ per ha	Labor, tractor and machine costs, $ per ac.
Fertilizing	1	.20	.08	4.57	1.85
Cutting	2	1.63	.66	96.72	39.14
Raking	2	1.38	.56	39.78	16.10
Baling (1st cut)[a]	1	2.30	.93	51.82	20.97
Baling (2nd cut)[b]	1	1.73	.70	38.84	15.72
Hauling and unloading (1st cut)	1	2.30	.93	31.63	12.80
Hauling and unloading (2nd cut)	1	1.73	.70	23.72	9.60

[a]Yield 1st cut 5.2 t/ha; 2.3 ton/acre

[b]Yield 2nd cut 3.8 t/ha; 1.7 ton/acre

Table 15. - Corn Silage: Estimated Cost of Production, Ontario, 1986

	Cost, $	
	per hectare	per acre
VARIABLE COSTS		
Hired labor, .1 hours/ha	1	1
Seed, 59,000 kg/ha	53	21
Fertilizer, N - 127 kg/ha; P_2O_5 - 55 kg/ha; K_2O - 28 kg/ha	101	41
Herbicide	51	21
Insecticide	28	11
Tractor and machine costs:		
Repairs and maintenance	21	9
Fuel	29	12
Custom apply "N"	20	8
Custom harvesting and silo filling	105	42
Silo repair and maintenance	2	1
Interest on operating capital	24	10
TOTAL	435	177
FIXED COSTS		
Operator labor, 3.36 hours/ha	23	9
Management allowance, 5% of gross income	38	15
Tractor and machine costs:		
Depreciation	31	12
Interest on investment	17	7
Insurance and storage	6	3
Interest on land, $2,224/ha @ 6.6% per annum	147	59
Taxes	14	6
Silo; interest, depreciation & insurance	64	26
Other overhead costs	37	15
TOTAL	377	152
TOTAL ALL COSTS	812	329
COST PER UNIT (Based on average yields of 29.2 tonne/ha and 13.0 ton/acre)[a]	$27.81/tonne	$25.30/ton
GROSS MARGIN ANALYSIS (Based on average prices of $26.30/tonne and $23.87/ton)[b]		
Gross income	768	310
Total variable costs	435	177
Gross margin	333	133
CASH ANALYSIS		
Gross income	768	310
Cash costs[c]	493	201
Returns over cash costs	275	109

[a]Yield is the five-year weighted average for 1981-85.

[b]Silage price per ton of $26.30/tonne ($23.87/ton) equals the grain corn price per bushel for same period times seven.

[c]Cash costs include total variable costs, plus interest on debt portion of investment in tractors and machines of $7/ha ($3/acre) plus taxes and other overhead costs.

Table 16. - Corn Silage: Operation Costs, Ontario, 1986

Operation	Times over	Labor hours per ha	Labor hours per ac.	Labor, tractor and machine costs, $ per ha	Labor, tractor and machine costs, $ per ac.
Plowing	1	.79	.32	33.04	13.37
Discing	1	.30	.12	14.55	5.89
Spreading fertilizer	1	.49	.20	12.36	5.00
Cultivating, harrowing and packing	1	.30	.12	13.05	5.28
Hauling seed	1	.15	.06	4.67	1.89
Planting	1	.59	.24	27.08	10.96
Spraying herbicide	1	.30	.12	8.03	3.25
Row cultivating	1	.30	.12	7.64	3.09
Custom applying "N"	1	—	—	19.52	7.90
Custom harvesting and silo filling	1	—	—	105.02	42.50

-- not applicable

Appendix Table 1 - Average Farm Yields, Grain and Forage Crops, Ontario, 1980-1985

Crop	1980	1981	1982	1983	1984	1985[a]	5-year 1981-85 Weighted Average
				- per acre -			
Winter Wheat...bu	55	52	43	51	57	67	55
Spring Wheat...bu	39	40	40	36	43	51	42
Rye.....bu	37	37	35	34	37	40	37
Oats.....bu	59	54	61	46	60	67	57
Barley.....bu	58	57	59	46	65	67	58
Mixed Grains...bu	64	62	64	49	65	70	61
Grain Corn.....bu	93	95	98	92	96	101	97
Soybeans.....bu	37	32	35	29	34	37	34
Flaxseed.....bu	24	25	22	13	25	25	22
Buckwheat.....bu	n/a	20	22	19	23	23	21
Canola.....bu	n/a	n/a	n/a	19	33	36	n/a
White Beans...cwt	16.3	13.0	13.6	12.5	13.3	14.3	13.4
Fodder (silage) corn.....tons	13.0	13.3	12.5	11.4	12.9	12.6	13.0
Hay.....tons	3.0	3.0	3.0	2.9	3.1	3.0	3.0

Appendix Table 2 - Farm Prices, Grain and Forage Crops, Ontario, 1980-1985

Crop	1980	1981	1982	1983	1984	1985[a]	5-year 1981-85 Average
				- dollars -			
Winter Wheat...bu	4.47	4.27	4.48	3.99	4.20	3.85	4.16
Spring Wheat...bu	4.25	3.90	3.45	3.90	4.00	3.75	3.80
Rye.....bu	4.10	3.50	2.25	2.50	2.65	2.50	2.68
Oats.....bu	2.14	2.06	1.80	2.21	2.15	1.76	2.00
Barley.....bu	2.90	2.65	2.34	3.05	2.97	2.32	2.67
Mixed Grains...bu	2.45	2.27	1.99	2.57	2.40	1.83	2.21
Grain Corn.....bu	3.84	2.92	2.84	3.97	3.41	2.91	3.21
Soybeans.....bu	8.53	7.19	6.80	9.33	7.55	6.70	7.51
Flaxseed.....bu	8.90	8.50	6.85	8.00	7.45	6.50	7.46
Buckwheat.....bu	3.45	3.30	2.90	3.00	4.00	4.00	3.44
Canola.....bu	n/a	n/a	n/a	n/a	7.80	6.55	n/a
White Beans...cwt	28.50	30.70	24.44	28.41	23.61	17.61	24.95
Fodder (silage) corn.....ton	18.50	18.10	17.40	21.40	21.70	22.20	20.16
Hay.....ton	44.80	45.70	47.10	50.40	50.10	50.00	48.66

n/a Not available
[a]Prices and/or yields are subject to revision.
Source: Agricultural Statistics for Ontario, Ontario Ministry of Agriculture and Food, Toronto

Appendix Table 3 - Average Farm Yields, Grain and Forage Crops, Ontario 1980-1985

Crop	1980	1981	1982	1983	1984	1985[a]	5-year 1981-85 Weighted Average
				- kilograms/hectare -			
Winter Wheat...	3,700	3,500	2,900	3,400	3,900	4,500	3,700
Spring Wheat...	2,600	2,700	2,700	2,400	2,900	3,400	2,820
Rye.....	2,300	2,300	2,200	2,100	2,300	2,500	2,280
Oats.....	2,200	2,000	2,300	1,700	2,300	2,600	2,170
Barley.....	3,100	3,100	3,200	2,500	3,200	3,600	3,120
Mixed Grains...	2,900	2,800	2,900	2,200	2,900	3,100	2,780
Grain Corn.....	5,800	6,000	6,200	5,800	6,100	6,300	6,090
Soybeans.....	2,500	2,200	2,300	2,000	2,200	2,500	2,290
Flaxseed.....	1,500	1,600	1,400	820	1,600	1,600	1,400
Buckwheat.....	n/a	1,100	1,200	1,000	1,300	1,300	1,180
Canola.....	n/a	n/a	n/a	1,060	1,850	1,300	n/a
White Beans....	1,800	1,450	1,530	1,400	1,480	1,610	1,480
				- tonnes/hectare -			
Fodder (silage) corn.....	29	30	28	26	29	28	28
Hay.....	6.7	6.8	6.7	6.5	6.8	6.8	6.7

Appendix Table 4 - Farm Prices, Grain and Forage Crops, Ontario, 1980-1985

Crop	1980	1981	1982	1983	1984	1985[a]	5-year 1981-85 Average
				- dollars/tonne -			
Winter Wheat...	164.30	157.00	165.00	146.00	154.00	141.45	152.70
Spring Wheat...	156.00	143.00	127.00	143.00	151.00	138.00	140.40
Rye.....	161.00	140.00	89.00	98.00	102.00	98.00	105.40
Oats.....	139.00	134.00	117.00	143.00	139.00	114.00	129.40
Barley.....	141.48	122.00	107.00	140.00	136.00	106.50	122.30
Mixed Grains...	135.00	125.00	110.00	144.00	142.00	101.00	124.40
Grain Corn.....	151.36	115.00	112.00	159.00	134.00	114.50	126.90
Soybeans.....	313.49	264.00	250.00	343.00	278.00	246.00	276.20
Flaxseed.....	350.00	333.00	270.00	315.00	293.00	256.00	293.40
Buckwheat.....	n/a	152.00	133.00	138.00	184.00	184.00	158.20
Canola.....	n/a	n/a	n/a	n/a	344.00	289.00	n/a
White Beans....	628.32	677.00	539.00	626.00	551.00	388.00	556.20
Fodder (silage) corn.....	20.40	20.00	19.20	23.60	23.90	24.50	22.25
Hay.....	49.40	50.30	51.90	55.60	55.20	55.10	53.60

n/a Not available

[a]Prices and/or yields are subject to revision

Source: Agricultural Statistics for Ontario, Ontario Ministry of Agriculture and Food, Toronto

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